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**RESEARCH AND TEST LABORATORY
FIRE SAFETY OF CONSTRUCTIONS**

1ST DEGREE CERTIFIED LABORATORY
I.S.C. LICENSE No. 2134 / 13 September 2010

INCD "URBAN-INCERC" General Manager
Vasile Meita, Associate Professor, PhD, Architect
[Illegible Signature]

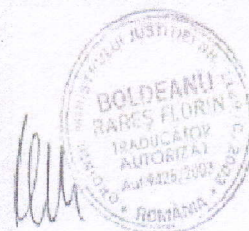
Official Seal

Contract: 528T/2012

TEST REPORT no. 32 / 03 December 2012

Determination of fire resistance for non-load-bearing elements

1. **Name of item to be tested:** fire resistant self-supporting wall SIP PANEL type.
 2. **Customer's name:** S.C. SIP PANEL TECHNOLOGIES S.R.L. Bucharest.
 3. **Customer's address:** 16 G-ral Eremia Grigorescu Street, District 1.
 4. **Identification of specification or test procedure:**
The determination was performed in accordance with Standard SR EN 1363-1: 2001-Part 1: General requirements. SR EN 1364-1: 2002 Fire-resistance tests of non-load-bearing elements. Part 1: Walls, and in compliance with the technical execution procedure PTE-FOC-01.02.
 5. **Description and identification of the item under testing:**
The self-supporting wall is made of two magnesium oxide plates, with a thickness of 12.5 mm and a core of Elastopor polyurethane foam with a thickness of 125 mm. The total thickness of the test specimen is 150 mm. The dimensions of the wall under testing were: 3,000 (L) X 3,000 (I) mm.
The construction details provided by the manufacturer are presented in Appendix 7 - fig. 9.
Specimen code: 327/2012
 6. **Date of receipt of the item being tested:**
According to the protocol code F-PG-5.8-01 dated 30 November 2012
 7. **Date of test:** 03 December 2012
 8. **Description of sampling procedure:**
The sampling was carried out by the Customer.
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9. Results obtained:

Storage conditions:

During storage, the test specimen was maintained at an ambient temperature of 23 ± 10 °C and a relative humidity of $50 \pm 10\%$.

Bearing conditions:

The specimen was mounted in the oven opening with all edges simply supported. The edges have been sealed with mineral wool.

Testing conditions:

The environmental conditions in the testing room before beginning the test:

Relative air humidity [%]

71.7

Ambient air temperature [°C]

10.0

- Due to a fault, Te2 and Te7 thermocouples, positioned within the oven, as shown in FIG. 1, do not function. This does not affect the quality of the test, nor the quality of the results obtained.

Table 1

Minute	Comments on the unexposed surface of the specimen, during the test
0	Test start
1	All burners switch on
18	The specimen is within the limits of the standard; Average internal temperature of the oven is $T_{\text{average}} = 637$ °C;
30	There is a slight release of smoke from in top of the specimen; (see photo 2)
48	The test continues under standard conditions; The specimen maintains its performance criteria within the limits of the standard; The specimen does not show significant deformation The average temperature in the oven is $T_{\text{average}} = 715$ °C;
62	The temperatures from the unexposed side are slowly growing;
78	The color of the smoke turns yellowish white; (see photo 3)
89	The amount of smoke emitted increases; The color of the smoke turns yellowish-brown; (see photo 4) The specimen no longer meets the <i>tightness</i> performance criteria; (see photo 5) The maximum temperature recorded on the unexposed surface is $E_{11\text{max}} = 94$ °C;

Remarks:

The conformity of the specimen was verified before and after the test for checking the construction details provided by the manufacturer. The specimen inspection consisted of checking the overall dimensions and its thickness.

The construction of the self-supporting wall is symmetric.

During the test, the specimen does not show significant deformation against its original shape.

The smoke emitted is choking and difficult to breathe.

• *This report details the method of construction, the test conditions and results obtained when the specific construction element described here was tested according to the procedure described in EN 1363-1 and EN 1363-2, as appropriate. Any variation on size, constructional details, loads, unitary forces, shape or end conditions other than those permitted under the direct scope according to the appropriate test method, is not the subject of this report.*

• *Due to the nature of fire resistance test and, therefore, the difficulty to quantify the fire resistance measurement uncertainty, it is not possible to specify the accuracy degree of the result.*

• *The test report may not be reproduced, partially and / or fully, without the written approval of the laboratory that performed the test. Appendix 1, Appendix 2, Appendix 3, Appendix 4, Appendix 5, Appendix 6. Appendix 7 are part of this test report.*

• *This test result relates only to the item subject to testing.*

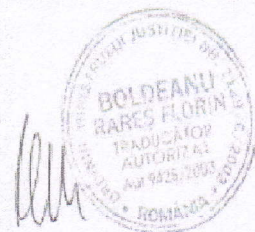
The results obtained following the test:

Table 2

No.	Normative reference	Performance criteria		Test results
1	SR EN 1363-1: 2001 SR EN 1364-1: 2002	Tightness	Cotton carbonization	89 The performance criterion is not lost
2			Penetration of a device for measuring holes	89 The performance criterion is not lost
3			The occurrence of supported flame	89 The performance criterion is not lost
4		Insulation	Average temperature increase of more than 140 °C against the initial average temperature	89 The performance criterion is not lost

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5			Temperature increase in any point of more than 180 °C against the initial average temperature	89 The performance criterion is not lost
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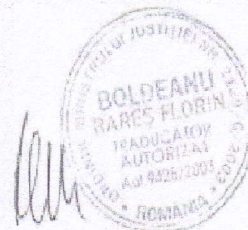
The *Tightness* performance criterion is lost in the minute 89 by failing to meet the performance sub-criteria “*Occurrence of supported flame*” and “*Penetration of a device for measuring holes*”, when the average temperature recorded on the unexposed side of the self-supporting wall is of 59 °C.

The *Insulation* performance criterion should be considered automatically not met if the *tightness* criterion ceases to be met.

Approved by,
General Manager INCERC Bucharest Subsidiary
Claudiu Matei, Engineer
[Illegible Signature]

Checked by,
Head of Laboratory
Lapad Bubulete, Engineer
[Illegible Signature]

Prepared by,
Octavian Lalu
[Illegible Signature]



Appendix 1 of the test report no. 32 / 03 December 2012

Layout of thermocouples

1. The layout of thermocouples within the oven is shown in Fig. 1.
2. The layout of thermocouples on the unexposed surface is shown in Fig. 2.

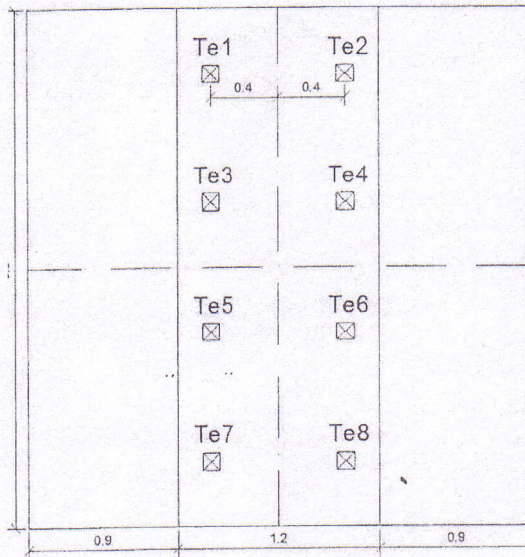


Fig. 1

Positioning of thermocouples inside the oven

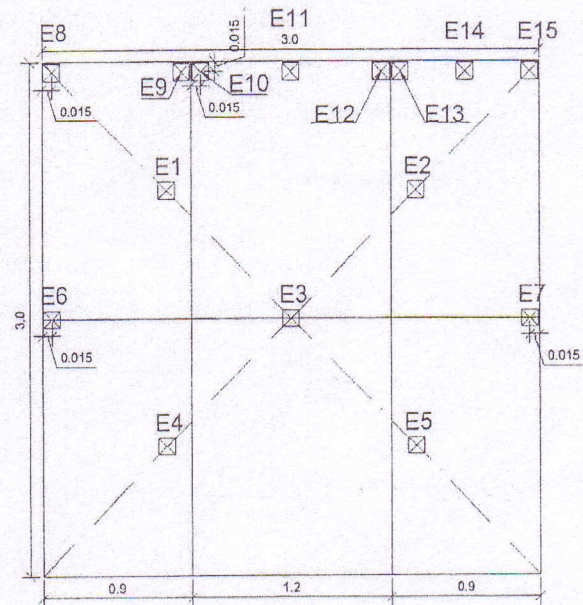


Fig. 2

Positioning of thermocouples on the unexposed side of the specimen

Remarks:

- Te1-Te8 – represents the thermocouples mounted inside the oven;
- E₁-E₁₅ – represents the thermocouples mounted on the unexposed surface of the specimen;
- E₁E₅ - represents the thermocouples to record the average temperature increase on the surface unexposed to the fire action;
- E₆-E₁₅ – represents the thermocouples to record the maximum temperature increase on the surface unexposed to the action of fire;
- Dimensions are given in meters.

Appendix 2 of the test report no. 32 / 03 December 2012

Records of the temperature in the measuring areas on the unexposed surface throughout the test

Table 3 indicates the measured temperature values on the surface unexposed to the action of fire, of the specimen, according to the positioning of the thermocouples in Figure 2.

Table 3

Time [min]	E1 [°C]	E2 [°C]	E3 [°C]	E4 [°C]	E5 [°C]	E6 [°C]	E7 [°C]	E8 [°C]	E9 [°C]	E10 [°C]	E11 [°C]	E12 [°C]	E13 [°C]	E14 [°C]	E15 [°C]
0	11	10	11	10	11	10	11	11	10	10	10	10	10	10	11
18	14	15	14	13	14	16	17	18	19	18	17	18	19	17	18
30	18	19	18	20	19	24	29	38	44	45	36	37	38	36	47
48	40	44	43	38	40	41	38	48	50	47	66	44	56	55	49
62	55	54	55	56	47	59	60	63	59	69	59	53	60	59	58
78	58	59	61	57	56	61	62	70	64	62	77	64	69	70	64
89	59	60	64	59	61	64	65	74	76	75	94	78	77	74	75

The maximum temperature on the unexposed side, in minute 89, is recorded by thermocouple E₁₁ and has the value E_{11max} = 94 °C.

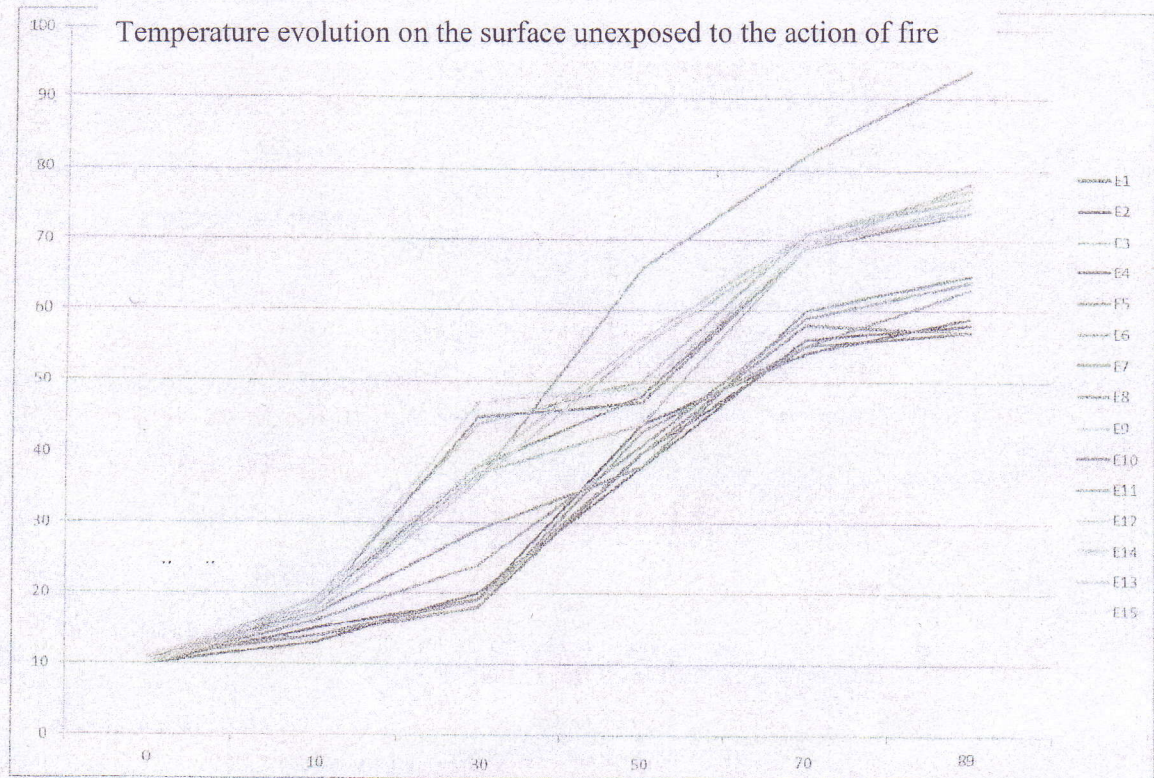


Fig. 3

Graphic recording of the temperature in the measuring areas on the unexposed surface

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Records of the oven temperature throughout the test

Table 4 shows the temperature values measured inside the oven for testing, according to the positioning of the inner thermocouples in Figure 1.

Table 4

Time [min]	Te1	Te2	Te3	Te4	Te5	Te6	Te7	Te8	Average [°C]	Standard curve
5	562	-	572	577	553	571	-	575	568	576
10	570	-	576	584	556	573	-	574	572	603
16	613	-	613	620	594	609	-	608	610	626
25	637	-	637	647	628	635	-	638	637	645
42	649	-	660	671	662	664	-	675	664	663
55	651	-	672	682	695	689	-	698	681	678
67	666	-	696	722	739	724	-	743	715	739
75	720	-	765	786	809	798	-	809	781	781
80	773	-	791	765	776	777	-	781	777	815
89	774	-	792	766	777	778	-	782	778	820

Te1-Te8 [°C] - represents the flat thermocouples, for temperature measurement, inside the oven.

Due to a technical failure, Te7 Te2 thermocouples, positioned inside the oven, as shown in Figure 1, does not function. This does not affect the quality of the test, or the quality of the results obtained.

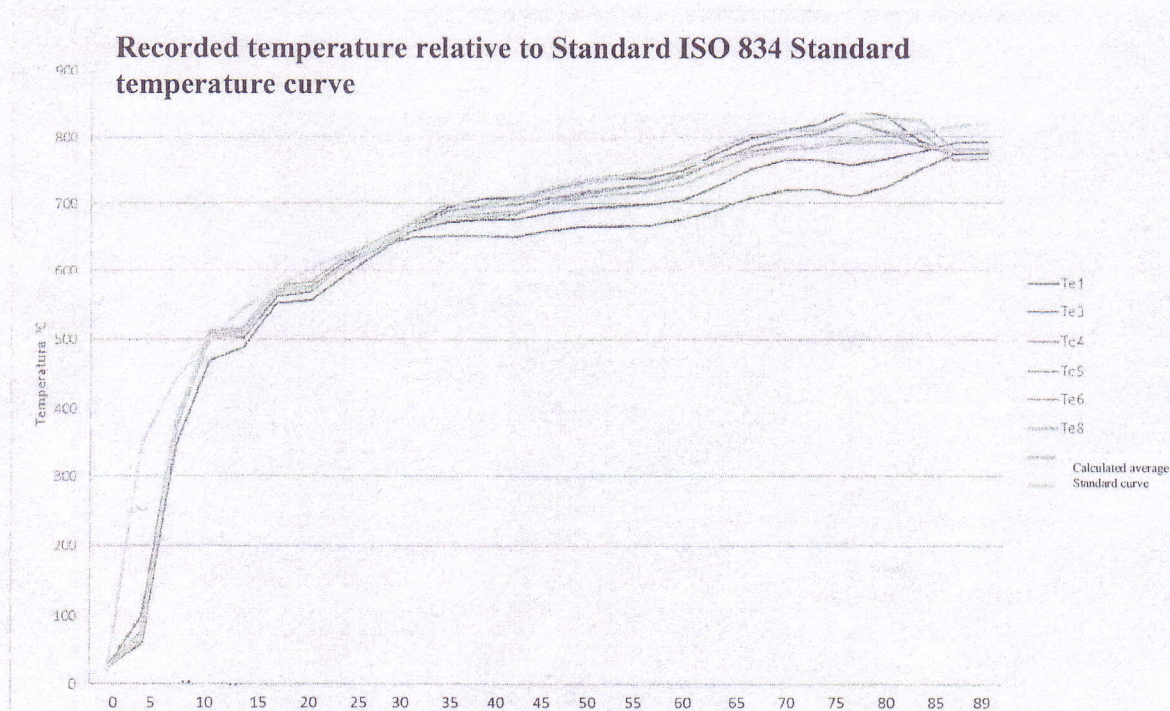


Fig. 4 - Temperature recorded during the test inside the oven

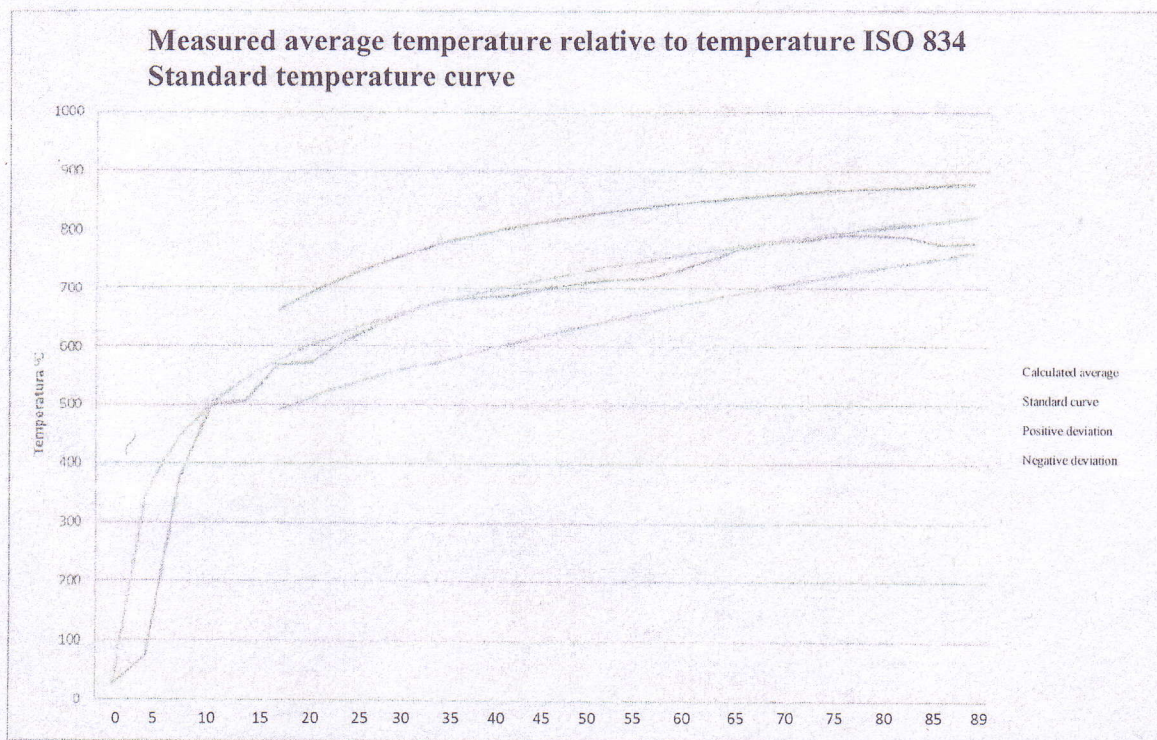
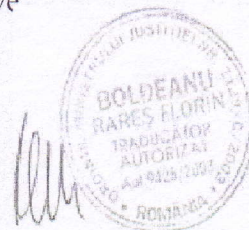


Fig. 5 - Average temperature recorded during the test inside the oven in relation to ISO 834 Standard temperature curve

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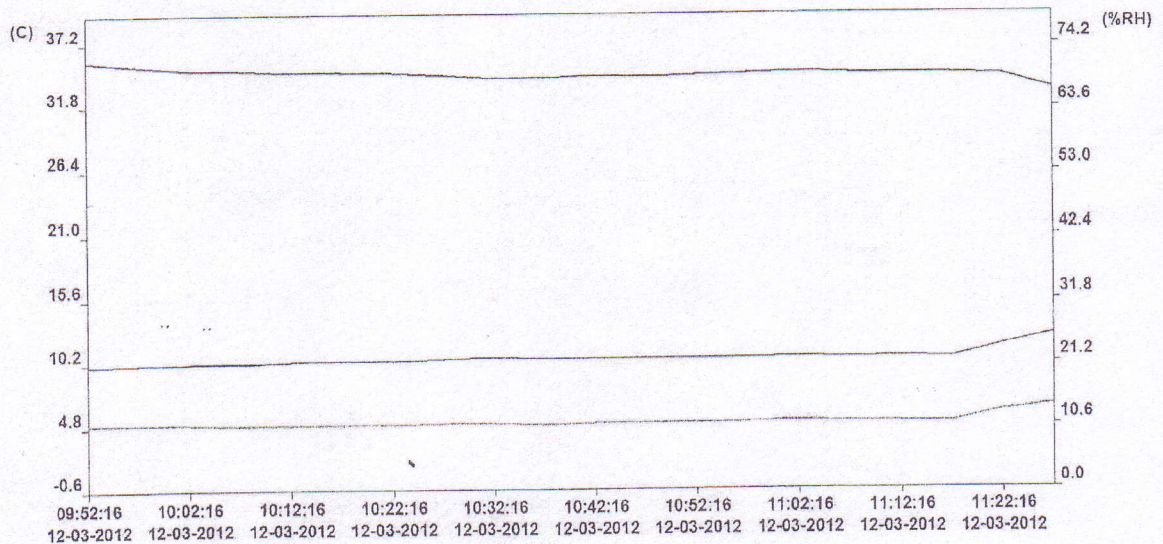
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Records of the environmental conditions in the test chamber throughout the test

Temperature and relative humidity in the laboratory



Temperature

Relative humidity

Dew point temperature

Fig. 6

Evolution of temperature and relative humidity inside the test laboratory throughout the test and post-test

Appendix 5 to the test report no. 32 / 03 December 2012

Records of the oven pressure and the deformations in the middle area of the test specimen

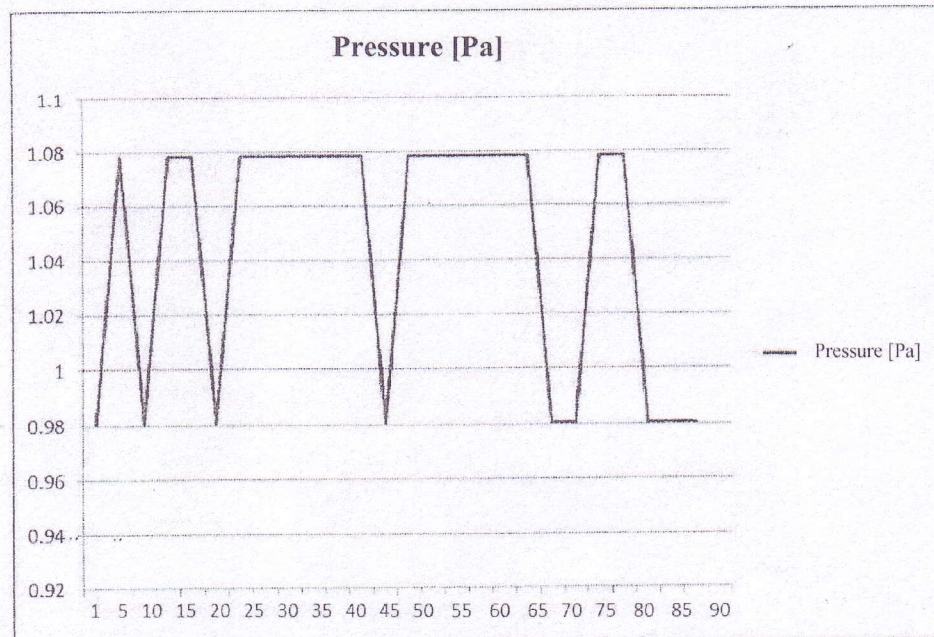


Fig. 7

The pressure recorded during the test inside the oven

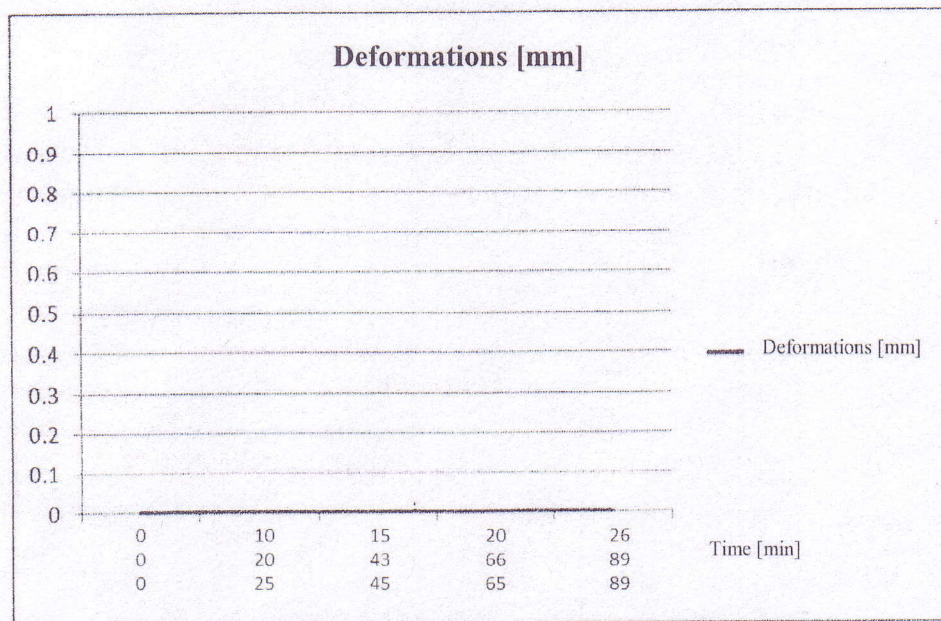


Fig. 8

Deformations recorded during the test

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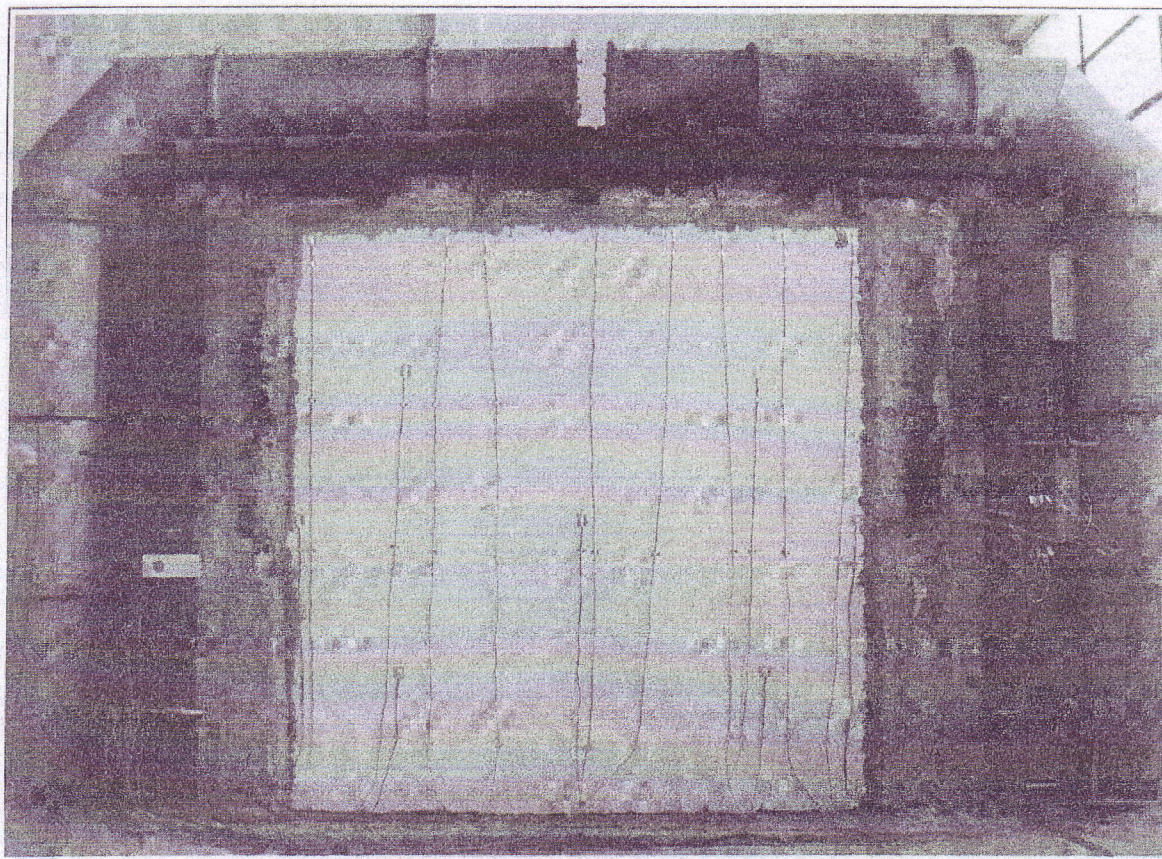


Photo 1

Positioning of the thermocouples on the unexposed surface

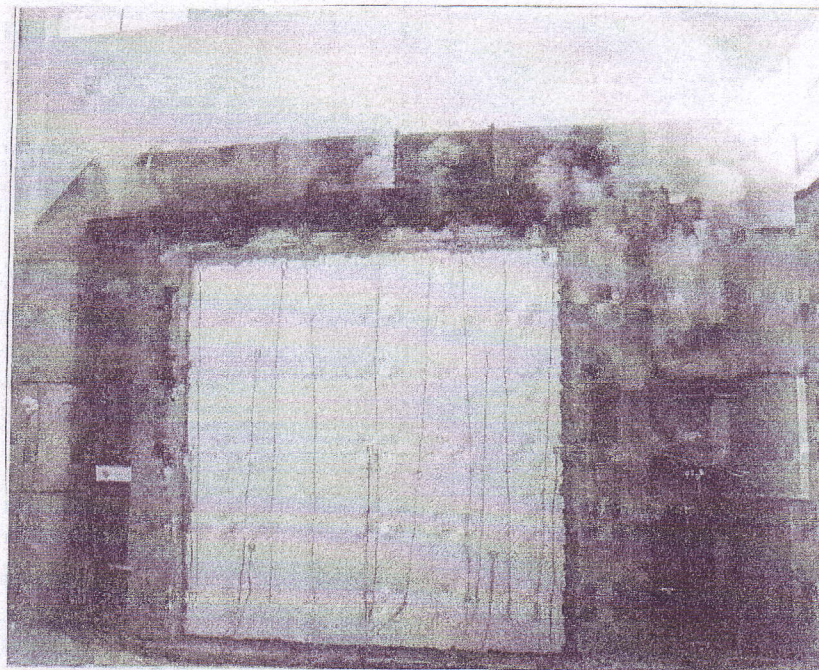


Photo 2

See Table 1 min. 30

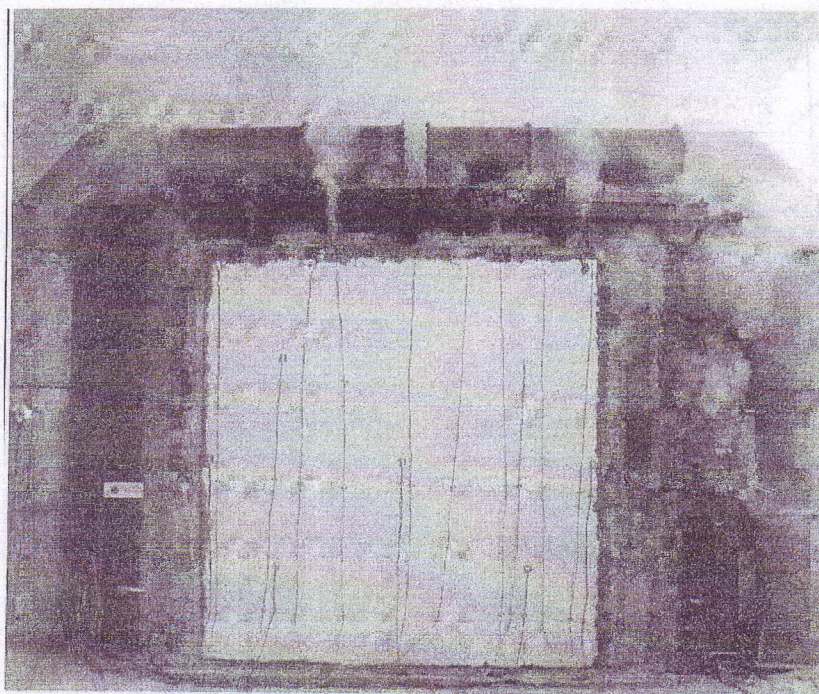
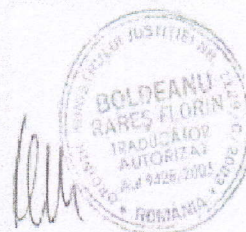


Photo 3

See Table 1 min. 48

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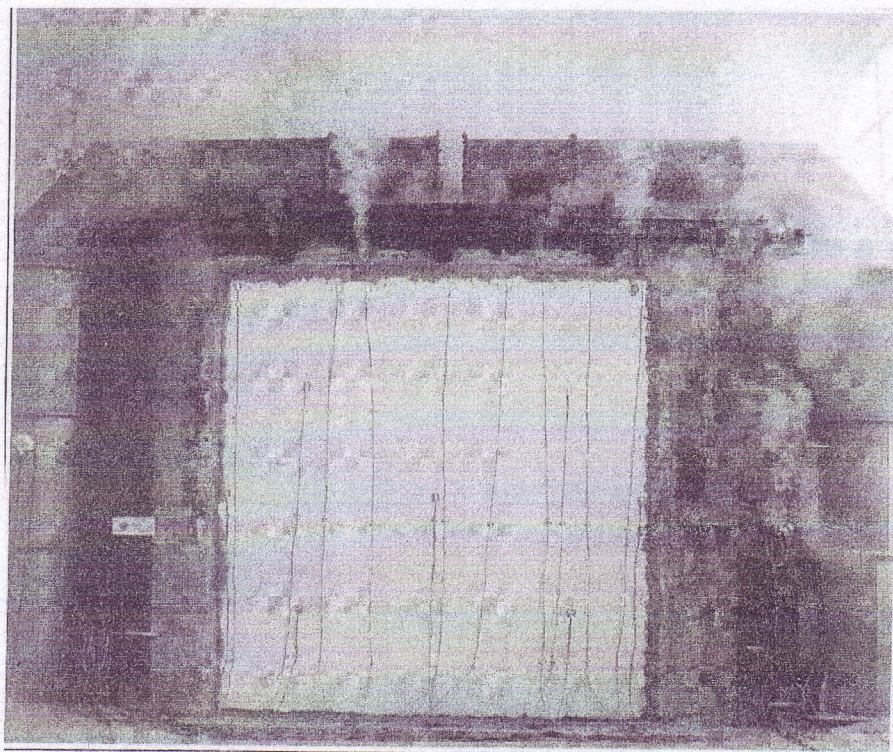


Photo 4
See Table 1 min. 78

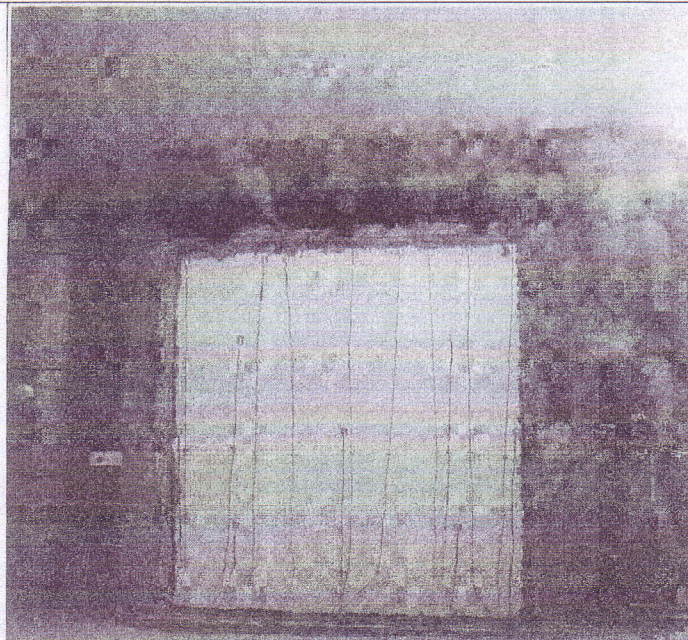
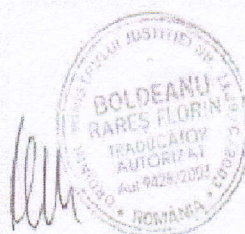


Photo 5
See Table 1, min. 89

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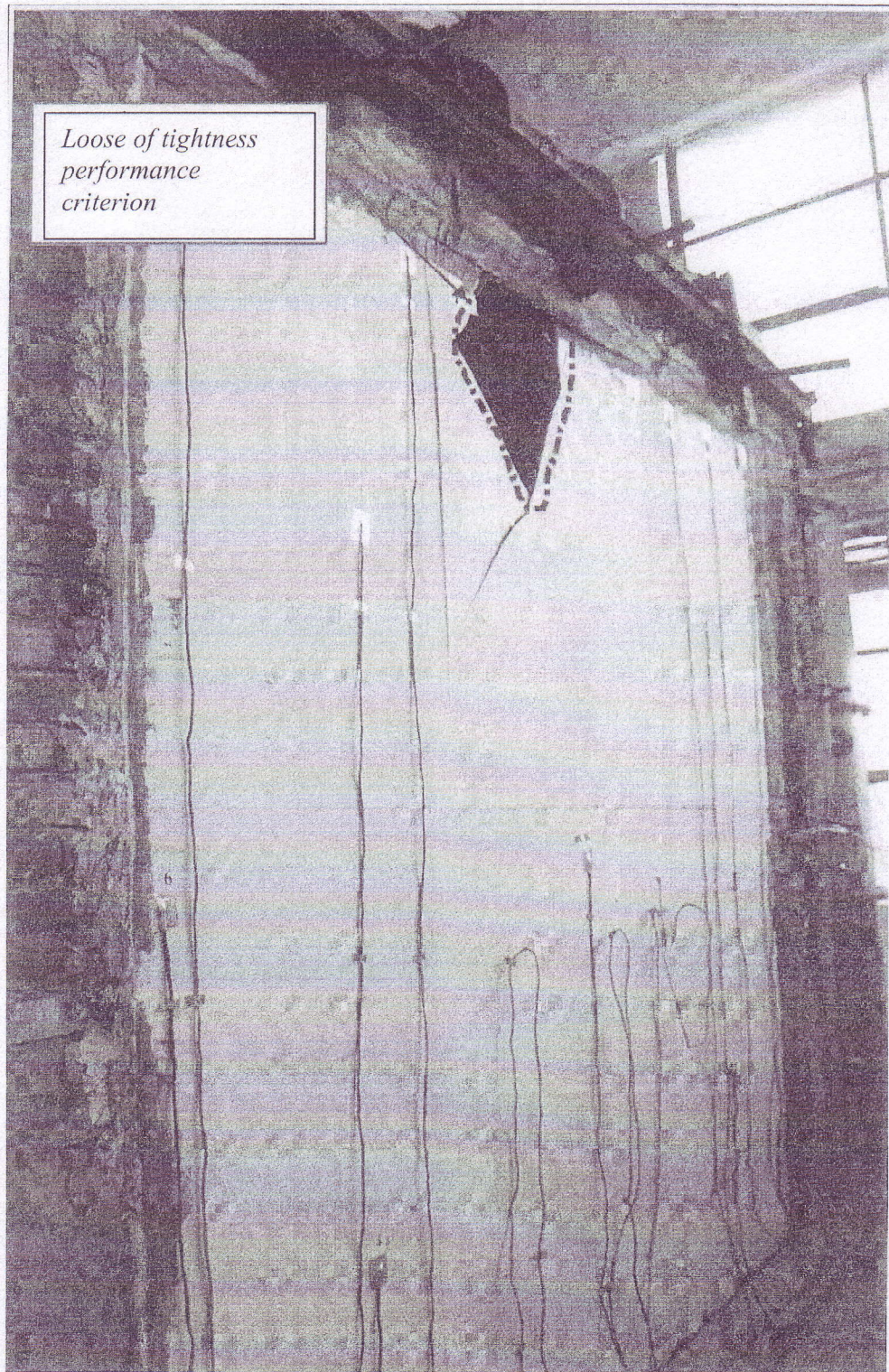
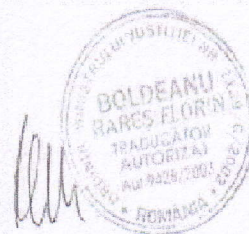


Photo 6

See Table 1, min. 89

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Details of construction provided by the manufacturer

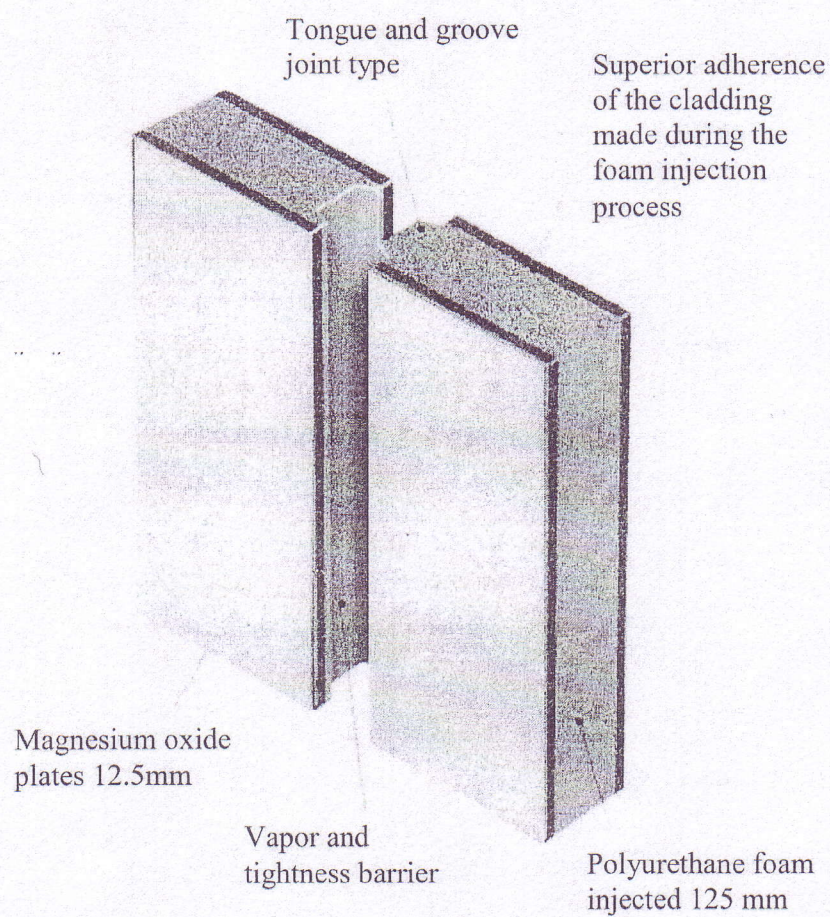


Fig.9

Construction detail of the tested element